REFRIGERATING APPLIANCE AND DOOR FOR ONE SUCH APPLIANCE

The present invention relates to a refrigerating appliance, especially its door.

The housing of conventional refrigerating appliances comprises a heat-insulating body and a likewise heat-insulating door which abuts against a front of the body and extends mostly over the entire width of the body. In a known housing of a refrigerating appliance the door ends a few centimetres below the upper edge of the body to leave space for a control panel which is mounted on the upper edge of the body above the door, whose front ends flush with the front of the door and which serves to accommodate switches, push-buttons or other control elements for adjusting an operating status of the refrigerating appliance as well as display elements which provide information on operating parameters of the refrigerating appliance in an accessible position clearly visible for the user.

In order to satisfy the taste of the widest possible range of customers, it is desirable for the manufacturers of refrigerating appliances to be able to supply refrigerating appliances with different appearances, where particular importance is attached to the door as the most striking part of the refrigerating appliance. One possibility for modifying the appearance is to enlarge the door such that it covers the body of the refrigerating appliance as far as its upper edge, including the control panel attached thereto. However, this has the result that the convenient operation and visibility of the control panel are lost.

It is the object of the invention to provide a door for a refrigerating appliance or a refrigerating appliance where the door is raised up to the upper edge of the body without at least

the visibility of control elements attached to a front side of the body being lost when the door is closed.

This object is solved by a door having the features of claim 1 or a refrigerating appliance according to claim 14.

The viewing window can extend over the total thickness of the door; however, since in general no thermal insulation is required in the edge zone of the door where the viewing window is formed, it is sufficient if the inner wall of the door which together with the outer wall encloses the heat-insulating intermediate space of the door, is no larger than necessary to seal the interior of the body. The viewing window then only needs to be provided in the edge zone of the outer wall which projects over the edge of the inner wall, which substantially only has an aesthetic function.

The insulating intermediate space between the inner and outer wall is preferably closed on one side by an end element affixed to the edge of the outer wall in which the viewing window is cut out and an edge of the inner wall, which follows the contour of the at least one viewing window formed in the outer wall.

The viewing window can be completely open so that control and display elements arranged on a control panel of the body located therebehind can not only be viewed but can also be touched by hand.

In order to provide a smooth, easy-to-clean front of the refrigerating appliance, it is preferable if a transparent pane is arranged in the viewing window. Such a pane prevents control elements attached therebehind from being directly actuated when the door is open. However, the operation of the control elements is only of minor importance compared with the visibility of the display elements since the control elements are only rarely

actuated whereas the free visibility of the display elements at all times is important so that defective operating states or functional disturbances of the refrigerating appliance can be identified at all times, even when the door is closed.

The transparent pane can be formed in one piece with the end element or it can be inserted into a window cut-out of the end elements. In order to ensure that the pane abuts against the door over its entire edge, especially if the outer wall is arched in the area of the viewing window, it is appropriate if the pane is mounted under pre-stress. Locating means for locating the window on the door, which act centrally on the pane, are especially desirable for this purpose.

The pane can be made of a highly transparent material so that it allows an unhindered view of control and display elements of any kind located therebehind.

The pane can also be made of an opaque material; this is especially appropriate if the pane is constructed in one piece with the end element which for its part is preferably not transparent; provided that the opacity is not too great, such a pane especially allows self-illuminating display elements located a short distance behind the pane to be identified without any difficulty.

At least part of the back of the pane is preferably provided with a non-transparent decoration.

Further features and advantages of the invention are obtained from the following description of exemplary embodiments with reference to the appended figures. In the figures:

Fig. 1 is a perspective view of a refrigerating appliance according to a first embodiment of the invention;

Fig. 2 is a section through the upper region of the door of the refrigerating appliance from Fig. 1 at the height of the window;

Fig. 3 is a section through the upper region of the door of the refrigerating appliance from Fig. 1 in a sectional plane remote from the window, parallel to the sectional plane of Fig. 2;

Fig. 4 is a perspective view of a refrigerating appliance according to a second embodiment of the invention;

Fig. 5 is a section through the upper region of the door from Fig. 4;

Fig. 6 is a perspective partial view of the upper front region of a refrigerating appliance according to a third embodiment of the invention;

Fig. 7 is a perspective view of the pane of the door from Fig. 6;

Fig. 8 is a section similar to that of Fig. 2 through the door from Fig. 6; and

Fig. 9 is a perspective view of a refrigerating appliance according to a fourth embodiment of the invention.

Figure 1 shows a perspective view of a refrigerating appliance according to a first embodiment of the invention. A door 2 abuts against a body 1 of the refrigerating appliance. The door 2 is constructed in a manner known per se from a piece of sheet metal which is bent along a plurality of vertical lines to form an outer wall 3, side flanks 4 and lugs facing the front of the

body 1, which cannot be seen in the figure, and a plastic inner wall 9 (see Figs. 2, 3) whose vertical edges are affixed to the lugs. The inner and outer wall delimit an intermediate space 12 filled with insulating foam material. The horizontal edges of the inner and outer wall 3, 9 are not in contact with each other but are connected by upper and lower end elements 5, 6 which are made of plastic by injection moulding.

Figure 2 shows the upper end element 5 and its surroundings in a vertical section along the plane denoted by II-II in Fig. 1 and Fig. 3 shows a similar section along the plane III-III. The upper end element 5 comprises a horizontal plate 7 which is provided with grooves 8 on its underside in which the upper edges of the outer wall 3 and the inner wall 9 located at respectively the same level engage.

As shown in Fig. 3, the sheet-metal outer wall 3 is extended upwards by an outer wall piece 11 of the end element 5 in one piece with the plate 7. The hollow interior of the outer wall piece 11 is filled with insulating foam 12 as is the intermediate space between the outer wall 3 and inner wall 9. A window cut-out 13 is formed in this outer wall piece 11 and a pane 14 of highly transparent plastic such as PMMA or PC is mounted therein. The pane 14 has springs 15 at its outer edges which respectively engage in vertical grooves of the outer wall piece 11. A claw 16 moulded on the lower edge of the pane 14 is inserted in a recess on the upper side of the plate 7.

Visible through the pane 14 is a control panel 17 mounted at the upper front edge of the body 1 whereon especially display elements for displaying an operating state of the refrigerating appliance such as a digital temperature display, a fault warning light or the like are mounted.

The embodiment in Fig. 4 differs from that in Fig. 1 in that the sheet-metal outer wall 3 is extended upwards on both sides of the window cut-out 13 so that the vertical outer wall pieces from Fig. 3 are omitted. Instead the cross-section shown in Fig. 5 is obtained in the plane marked V-V in Fig. 4 which corresponds to the plane III-III in Fig. 1. The outer wall 3 extends as far as directly on the upper edge of the door 2 where it engages in a groove 8 of the upper end element 5. A vertical flank 18 of the upper end element 5 compensates for the height difference between the outer wall 3 and the inner wall 9.

A vertical section through the door 4 at the height of the window cut-out 13 does not differ from the section shown in Fig. 2 and is thus not shown on its own in a figure.

Figure 6 shows another perspective part view of the housing of a refrigerating appliance and its door according to the invention. In this embodiment the sheet-metal outer wall 3 is identical to that in Fig. 4. The upper end element 5 differs from the embodiment from Fig. 4 in that in the vicinity of the window cut-out 13 its front edge ends flush with the outer wall 3 as can especially be seen in the sectional view in Fig. 8. In this case, a groove 8 in which the upper edge of the outer wall 3 is inserted, is formed on the inside by a cross-piece 19 which projects downwards from the horizontal plate 7 of the end element 5 and on the outside by a lower edge region 20 of the pane 14 which projects slightly to the front over the outer wall 3.

Figure 7 shows a perspective view of the pane 14 seen from its back facing the body 1. A comparatively thick-walled central region 21, surrounded on three sides by the edge zone 20 can be seen, whose dimensions are such that it engages in positive contact in the window cut-out 13 of the end element 5 whereas the edge zone 20 comes to rest externally on the outer wall 3. A

short powerful claw 16 projects downwards from the lower edge of the central region 21 in order to engage in a recess of the plate 7. Like the outer wall 3, the pane 14 is slightly cylindrically arched with a convex outer side. The curvature of the pane 14 is greater than that of the outer wall 3 so that if the edge regions 22 each abut with their side edges against the outer wall 3, the interposed region of the pane 14 projects slightly from the outer wall 3 in a stress-relieved state. Only when the plane 14 is slightly elastically deformed by pressing on its central area does the claw 14 come to rest exactly over the recess of the plate 7 so that it can be located from above in the recess and the pane 14 can thereby be anchored. It can thus be ensured in a simple fashion that the entire edge region 22 of the window 14, especially its lower edge, abuts in positive contact against the outer wall 3 even when the curvature of the outer wall 3 has a slight scatter caused by the manufacturing.

On its inner side facing the outer wall 3 and the end element 5 the edge zone 20 is provided with a coloured non-transparent decoration adapted to the outer wall 3 or the end element 5, which covers the edge of the outer wall 3 in the vicinity of the window cut-out 13 so that slight dimensional deviations in this area between outer wall 3 and end element 5 remain invisible and do not appear as blemishes.

Figure 9 shows a fourth embodiment of a refrigerating appliance according to the invention. The sheet-metal outer wall 3 only differs from that shown in Fig. 4 in that the grooves 8 on both sides of the window cut-out are omitted in Fig. 9. No window is inserted in the window cut-out, instead the control panel 17 affixed to the front upper edge of the body 1 is drawn so far forward in this area that it engages in the window cut-out and has a front face 22 flush with the outer wall 3 or the upper end element 5 towards the front. Since the front face 22 is not only

freely visible when the door is closed, but can also be touched, control elements can suitably be attached thereon, which a user can actuate to regulate the operating state of the refrigerating appliance.

As a result of another embodiment not shown in a figure, the upper end element 5 and the pane 14 can be manufactured in one part from the same plastic material. In general, non-transparent plastic material pigmented in the colour of the outer wall 3 is used for the end element 5. However, its wall thickness can be reduced to such an extent in the area of the pane that it at least has a translucent effect. A luminous display attached in a control panel mounted behind the pane at a short distance from the pane locally causes the translucent pane itself to light up so that the operating state indicated by the display can be read off directly on the pane itself.